

REMARKS

In connection with Applicants' Request for Continued Examination (RCE), Applicants respectfully request reexamination and reconsideration of the subject matter identified in caption, pursuant to and consistent with 37 C.F.R. §1.114, and in light of the remarks which follow.

Claims 60-64, 66-79, 81-87, 89-91 and 119-145 are present in this application. Claims 1-59, 65, 80, 88 and 92-118 were previously cancelled. Claims 78, 121, 129, 135, 141, 142, 144 and 145 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 133 has been amended to correct a typographical error by deleting the comma at the end of the claims and replacing it with a period.

No new matter has been introduced as a result of the foregoing amendments.

Claim Objections

Claim 133 is objected to because the claim ends in a comma, rather than a period.

Claim 133 has been amended to delete the comma and replace it with a period. Applicants request that this objection be withdrawn.

Claims 78, 121, 129, 135, 141, 142, 144 and 145 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any

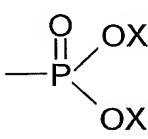
intervening claims. Applicants gratefully acknowledge the Examiner's indication that these claims would be allowable if rewritten in independent form. Applicants believe that it is premature to amend these claims to be in independent form at this time, in view of the responses to the rejected base claims.

35 U.S.C. §102(b) prior art rejections

Claims 66-68, 77, 85-87, 90, 91, 120, 122-126, 128, 130-134 and 136-140 have been rejected under 35 U.S.C. §102(b) as being anticipated by Killat et al. (US 4,871,779).

It is well established that in order to demonstrate anticipation over 35 U.S.C. § 102(b), each feature of the claim at issue must be found, either expressly described or under principles of inherency, in a single prior art reference. See, *Kalman v. Kimberly-Clark Corp.*, 218 USPQ 789 (Fed. Cir. 1983).

Claims 77, 85, 90 and 136 are the independent claims from which the other rejected claims depend. The independent claims require that the terminal group

consists of a group of the formula . There is only one terminal group at each final dendritic branch in the independent claims of the instant invention.

Killat relates to dense star polymers having at least one dendritic branch emanating from a core, with each dendritic branch having at least two terminal ion exchange moieties. (col. 2, lines 25-30).

The instant claims are directed to dendrimers comprising a single terminal group, -P(=O)(OX)₂, at the end of each intermediate chain. The claimed dendrimers contain only one terminal group for each branch. Therefore the claims of the instant

application are not anticipated by Killat because Killat does not disclose a single terminal group of the claimed structure on each branch, but rather requires at least two terminal ion exchange moieties in each dendritic branch. The Office Action has not shown that this feature is found, either expressly described or under principles of inherency, in Killat. Applicants respectfully submit that the claims are not anticipated by Killat et al. and the rejection should be withdrawn.

35 U.S.C. §103(a) Obviousness Rejections

1. Claims 60-64, 69-76, 79, 81-84, 89 and 143 have been rejected under 35 U.S.C. §103(a) as unpatentable over Caminade et al. (FR 2734268).

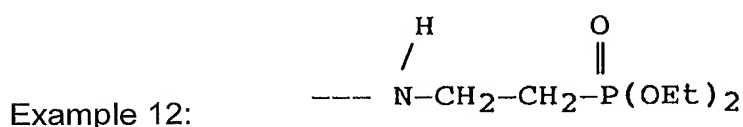
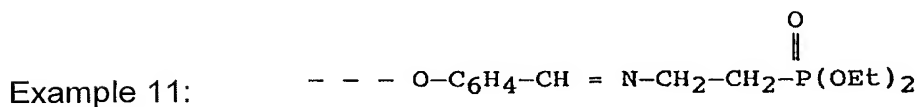
Claims 60-64, 69-76, 79, 81-84, 89 and 143 are not obvious over Caminade.

To establish a *prima facie* case of obviousness, three basic criteria must be met. (MPEP 2143) First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The Office Action indicates that Caminade discloses several dendrimers with phosphonic terminals in Examples 4-6, 11 and 12. The terminal groups in Examples 4 -6, 11 and 12 are shown below.

Example 4: $-\text{CH}_2-\text{P}(\text{OPh})_2$.

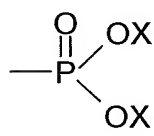
Examples 5 and 6: $-\text{CH}-\text{C}_6\text{H}_4-\text{O}-\text{P}(=\text{O})(\text{OPh})_2$



The Office Action indicates that Caminade discloses terminal groups of the



The terminal group required by the instant claims has the structure



One of ordinary skill in the art would recognize that the structure cited by the Office Action in Caminade requires an oxygen atom between the phosphorus and the intermediate chain, while the structure required in the instant claims requires the phosphorus atom to be connected directly to the intermediate chain. The Office Action also indicates that examples 11 and 12 have phosphonic groups where R⁴ and R^{4'} are ethoxy groups. The Office Action indicates that a prima facie case of obviousness made be made when chemical compounds have very close structural similarities and similar utilities.

The specification of the instant applications states on page 2, lines 7-21:

Dendritic polymers having various phosphorus-containing functions (phosphine, phosphinate, phosphate, phosphonate, phosphorane, spirophosphorane) have been described especially in the articles mentioned above or in French patent application FR 95 06 281.

However, no dendritic polymer having free phosphonic acid terminations, or optionally terminations in the form of salts or of the

corresponding methyl ester, has been described. In fact, it has hitherto been impossible to prepare such functionalities on dendritic polymers. More precisely, it was impossible to prepare dendritic polymers exhibiting a phosphonic acid function starting from the corresponding alkyl esters. This has now been made possible starting from the corresponding methyl ester.

The inventors have now found a reaction that allows that type of terminal functionality of the methyl ester or phosphonic acid type to be obtained on dendritic polymers.

Two of the inventors of the instant application are also inventors on French patent application FR 95 06 281.

To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. There is no suggestion or motivation in Caminade to form the claimed compositions which require a specific terminal group on the intermediate chains. One of ordinary skill in the art would recognize that methyl and ethyl esters can differ significantly in terms of reactivity and physical properties. Such a person would also recognize that such changes could affect the properties of the dendrimers when these changes occur on the ends of the terminal chains. The changes in the properties of the dendrimers are magnified by the vast number of such terminal groups on the dendrimer. In Examples 11 and 12 of Caminade, there are 96 such terminal groups distributed at the external portion of the dendrimer. This change is more than a simple substitution because of the interactions of the very large number of groups with each other in the molecule. Therefore there is no

motivation or suggestion in Caminade to modify their invention to obtain Applicant's invention.

To establish a *prima facie* case of obviousness, there must be a reasonable expectation of success. The above cited paragraphs from the specification indicate that there would not have been a reasonable expectation of success in making the claimed composition based on the teachings in Caminade since:

However, no dendritic polymer having free phosphonic acid terminations, or optionally terminations in the form of salts or of the corresponding methyl ester, has been described. In fact, it has hitherto been impossible to prepare such functionalities on dendritic polymers. More precisely, it was impossible to prepare dendritic polymers exhibiting a phosphonic acid function starting from the corresponding alkyl esters. This has now been made possible starting from the corresponding methyl ester.

Two of the inventors of the instant application are also inventors on French patent application FR 95 06 281. One of ordinary skill in the art would recognize that there is nothing in Caminade which indicates that there would be a reasonable expectation of success in making the claimed compositions. There is nothing in the Office Action to refute the above statements in the specification. Therefore, there was no reasonable expectation of success at the time of the invention that the claimed invention could be obtained by modifying Caminade.

To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The specification of the instant applications states:

However, no dendritic polymer having free phosphonic acid terminations, or optionally terminations in the form of salts or of the corresponding methyl ester, has been described. In fact, it has hitherto been impossible to prepare such functionalities on dendritic polymers. More precisely, it was impossible to prepare dendritic polymers exhibiting a phosphonic acid function starting from the corresponding

alkyl esters. This has now been made possible starting from the corresponding methyl ester.

Two of the inventors of the instant application are also inventors on French patent application FR 95 06 281. Although the Office Action has indicated that it is *prima facie* obvious to produce a composition when the compounds have very close structural similarities and similar utilities. Given the statement in the instant specification by two of the inventors in French patent application FR 95 06 281 that "it has hitherto been impossible to prepare such functionalities on dendritic polymers" and that the Office Action admits that Caminade does not disclose the specific terminal groups of these claims, all of the claim limitations cannot have been taught or suggested. Therefore Caminade et al. does not teach or suggest all of the claim limitations of the instant claims.

Therefore, in consideration of the foregoing, Applicants respectfully submit that Claims 60-64, 69-76, 79, 81-84, 89 and 143 are not obvious over Caminade et al, and request that this rejection be withdrawn.

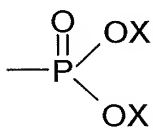
2. Claims 119 and 127 have been rejected under 35 U.S.C. §103(a) as unpatentable over Killat et al. (US 4,871,779) in view of Tomalia (US 4,507,466).

Claims 119 and 127 are not obvious over Killat in view of Tomalia.

Claim 119 depends from claim 77 and claim 127 depends from claim 85.

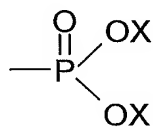
To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. There is no suggestion or motivation in Killat or

Tomalia to form a dendritic polymer with a single terminal group of the structure



on each branch. Therefore there is no motivation or suggestion in Killat or Tomalia to modify their invention to obtain Applicant's invention.

To establish a *prima facie* case of obviousness, there must be a reasonable expectation of success. There is no reasonable expectation of success based on the teachings in Killat and Tomalia to form a dendritic polymer with a single terminal



group of the structure on each branch. One of ordinary skill in the art would recognize that Killat does not disclose this element. The Office Action cites Tomalia for disclosing "that phosphine (a phosphorus containing molecule), ammonia, ethylene diamine and diethylenetriamine are functionally equivalent as core molecules." One of ordinary skill in the art would understand that the teachings in Tomalia are unrelated to the required element that is missing in the teachings of Killat. Such a person would recognize that there would not have been a reasonable expectation of success in making a required structural change when both of the cited prior art references are silent on this element. Therefore, there was no reasonable expectation of success at the time of the invention that the claimed invention could be obtained by modifying Killat with Tomalia.

To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. As shown above, Killat does not teach a single terminal group of the claimed structure on each. The Office Action relies on Tomalia to provide information regarding the

core elements, not the terminal elements. Therefore Killat and Tomalia do not teach or suggest all of the claim limitations of the instant claims.

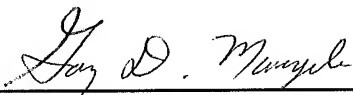
Therefore, in consideration of the foregoing, Applicants respectfully submit that Claims 119 and 127 are not obvious over Killat in view of Tomalia, and request that this rejection be withdrawn.

In view of the foregoing, it is believed that entry of the proposed amendments should be allowed and that the record rejections cannot be maintained against the proposed claims once entered into this application. Further, favorable action in the form of a Notice of Allowance is believed to be next in order and is earnestly solicited.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

Date: January 24, 2011

By: 
Gary D. Mangels, Ph.D.
Registration No. 55424

P.O. Box 1404
Alexandria, VA 22313-1404
703 836 6620